Raising Achievement in GCSE Science

Welcome
Aims

1. Conditions for maximising learning
2. Barriers to progression in Science
3. Target setting
4. Effective revision techniques and resources
The Male Brain

- Boys' brains have more cortical areas dedicated to spatial-mechanical functioning, **many boys prefer to move objects** through space, like balls or just their arms and legs!

- Boys not only have less serotonin than girls have, but they also have less oxytocin. This makes it more likely that they will be **physically impulsive** and less likely that they will combat their natural impulsiveness to sit still.
The male brain is set to recharge itself by entering a *rest state*. It is predominantly boys who drift off without completing assignments, who stop taking notes or who tap pencils and fidget in the hope of keeping themselves awake and learning.

The more words a teacher/parent uses, the more likely boys are to “zone out,” or go into rest state. The male brain is better suited for symbols, diagrams, pictures, and objects moving through space than for the monotony of words.
Helping Your Son at Home

• Encourage frequent breaks from homework to move around
For example, do 20 minutes of homework and then 10 minutes break. Set a timer.

• Help him move around while studying
Toss a ball back and forth while asking him questions, or make up studying games that require movement. For example, call out study questions. If he misses, you get to assign him an activity, such as running up and down the stairs three times. If he gets the answer correct, he gets to assign you an activity!
• **Find creative ways to help him stay focused**

Maybe he can walk on a treadmill while reading or sit on a balance ball instead of a desk chair.

• **Help your son stay organised**

It may not be enough to just check he has written his HW down or to buy him a revision guide. You may need to go over it with him every day as part of your homework routine and ask to see his revision notes.
Barriers to Progression in Science

- Rushing work; just ‘getting it done’ rather than ensuring the work is of good quality
- ‘You know what I meant’ mentality. Not using the precise scientific vocabulary
- Lack of detailed explanation; answers too brief
- Not showing workings out for calculations
- Illegible writing
- Not including units in an answer
- Not selecting the appropriate formula or being able to rearrange it for use in calculations
- Not writing in full sentences
- Not responding to teacher feedback
- Not making corrections when carrying out self assessment (just tick or cross)
- Poor presentation; not using rulers for tables, graphs and diagrams
- Low aspirations; being satisfied with a ‘pass’
- Saying the first answer that comes into your head! Not thinking your answer through first
- Passive learning; waiting for an answer rather than attempting the task yourself first
- Not reading the background information before answering a question (wanting to get straight to the point!)
Active Transport

- The movement of particles against a concentration gradient (from low concentration to high concentration) using energy released through respiration.

1. Plants need to take up mineral ions for healthy growth.

2. The concentration in the root hair cells is higher than the concentration in the soil.

3. Glucose is taken up by active transport in the gut — why?

The potato in pure water got bigger; it increased in mass.

This is because there was a lower concentration in the potato than the pure water.

The potato in 0.5M sucrose solution got smaller; it decreases in mass.

This is because the concentration was higher in the potato than the solution.

- Assuming the examiner knows what you’re talking about........
Lacking detail or sufficient examples
we know that they have changed because new theories were made, by using new technologies.

An excellent start! You have understood this topic well and got a fabulous score on your test.

Q: Why do isotopes have different mass numbers? Because isotopes have the same number of protons, but have a different number of neutrons, therefore the atomic number will always be the same, but the mass number will be different.
How are electrons arranged inside an atom?

\[
\frac{\text{mass of isotope 1 \times 9\%}}{100} + \frac{\text{mass of isotope 2 \times 8\%}}{100}
\]

\[
\begin{align*}
\text{Cl-35 (75\%)} & \quad \text{and} \quad \text{Cl-37 (25\%)} \\
(35 \times 0.75) + (37 \times 0.25) & = 35.5 \\
114.01 & \checkmark \\
2) 91.04 & \checkmark \\
3) 37.37 & \checkmark \\
& 42.85
\end{align*}
\]

2. In the first shell

\[
\begin{align*}
\text{Isotopes} \\
\text{How are electrons arranged inside an atom?} \\
& \frac{\text{mass of isotope 1 \times 9\%}}{100} + \frac{\text{mass of isotope 2 \times 8\%}}{100} \\
& 35^\text{Cl \ 75\%} + 37^\text{Cl \ 25\%} \\
& \frac{(35 \times 0.75) + (37 \times 0.25)}{100} = 35.5 \\
1) 14^\text{N \ 99\%} + 15^\text{N \ 1\%} \\
& \frac{(14 \times 0.99) + (15 \times 0.01)}{100} = 14.01 \\
2) 40^{\text{Z} \ 52\%} + 39^{\text{Z} \ 11\%} + 92^{\text{Z} \ 13\%} + 82^{\text{Br} \ 14\%} \\
& \frac{(40 \times 0.52) + (39 \times 0.11) + (92 \times 0.13) + (82 \times 0.14)}{100} = 91.04 \\
3) 79^{\text{Br} \ 52\%} + 71^{\text{Br} \ 48\%} \\
& \frac{(79 \times 0.52) + (81 \times 0.48)}{100} = 79.96 \\
\end{align*}
\]
1) Kidney dialysis;

Dialysis machine take over the role of failing kidneys & filter the blood. Dialysis has to be done regularly to keep the concentrations of dissolved substances (e.g. glucose, ions) in the blood at normal levels, & to remove waste substances.

In a dialysis machine the person's blood flows alongside a partially permeable membrane, surrounded by dialysis fluid. The partially permeable membrane allows things like ions & waste products through, but not big molecules like proteins. The dialysis fluid has the same concentration of dissolved ions & glucose as healthy blood. This means that useful dissolved ions & glucose won't be lost from the blood during dialysis. Only waste products like urea & excess ions, water diffuse across the membrane.
Being passive, not acting on teacher advice

(c) (i) Another way of treating kidney failure is with a kidney transplant.

A transplanted kidney can be rejected.

Explain why the new kidney may be rejected.

When your new kidney is in your body, your immune system can start to attack because it will see the antigens as foreign; the white blood cells will produce antibodies to attack the new kidney.
Your Tasks

• Look through your books with your parents/carers

• Tick off any of the issues that apply to you

• Discuss the importance of addressing these issues. *Why should you respond to teacher feedback?*

• Set yourself two targets that you will complete in your science lessons over the next term. Your teacher will check to see if you are working towards these.
study

(verb)

The act of texting, eating and watching TV with an open textbook nearby.
Reading notes and text books leads to a mere 10% retention 😞

66% material is forgotten after 7 days

88% material is forgotten after 6 weeks
Activity

Pick one topic from the PLC

Make 3 flashcards to revise this topic

Now give the flashcards to your parent/carer and get them to test you

Nucleus
Ribosome
Cell membrane
Mitochondria
Cytoplasm
<table>
<thead>
<tr>
<th>MEANINGFUL LEARNING</th>
<th>ROTE LEARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept is fully understood by students.</td>
<td>Verbatim memorization of new information.</td>
</tr>
<tr>
<td>Student can relate new information to what is already known.</td>
<td>No connection between previous and new knowledge.</td>
</tr>
</tbody>
</table>
• **Key tips for revision**

• Short bursts of revision; no more than one hour. Then take a 5-10 minute break

• Place all possible distractions away; put your phone in a different room!

• There are 25 weeks until the GCSEs begin. Divide up your PLC into 25 sections to ensure you cover everything by the exams

• Don’t just focus on recall of information. Remember to USE the information too. Answer exam questions. Draw mind maps to link different areas together. Draw cartoon strips to explain processes.

• Vary your revision techniques and use a range of resources to keep you motivated
Activity

Get out your phone!

Download these apps....

Gojimo

Go into Gojimo
Select GCSE
Select Biology
Select AQA
Try a quiz

BBC Bitesize
Thank you for coming

Any questions?